Notes on Australian Muscoidea III.

Dexiinae, Phasiinae, some Tachininae and Appendix.

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In the first part of this series of papers, the Tachinidae were divided into four subfamilies on the system then standing, but an advance was made in so far as the Dexiinae were defined on a better basis than previously attempted. In the present paper the same principles then used have been applied to the rest of the Tachinidae, resulting in subfamily divisions given in the following key:—

Key to subfamilies of the *Tachinidae.*

1. Primitive terminalia in which the aedeagus consists of membrane and chitin, never very long and the general features parallel with those of the Calliphorinae. The forceps may be (a) paired structures in the normal type, or (b) fused into one median structure lying between the accessory plates; though widely varying, these main features remain consistent .. .. *Tachininae*

   Advanced terminalia in which the aedeagus is invariably long, bristle-like and chitinous throughout, except perhaps hyaline at the extreme apex 2

2. Aedeagus consisting of one elongate bristle-like part, rarely expanding towards apex and then provided with some minute appendages there. Forceps fused or paired .. .. *Phasiinae*

   Aedeagus in two bristle-like parts, the apical one articulating with the basal one, and the forceps are invariably paired structures *Dexiinae*

The old subfamily Ameniinae becomes merged into the Tachininae and appears to be the most primitive of the Australian forms extant and hardly, at sight, distinguishable from the primitive genus of the Dexiinae. The structure referred to as "fused forceps" has yet to be ascertained morphologically for it seems to be highly important phylogenetically.

The new rendering of the Phasiinae is one which cannot be avoided at present, for it has to dispose of those forms before me which are apparently heterogeneous but do not conform to the more typical Tachininae. The group thus incorporates *Palpostoma* and certain other genera, but I do not know its limits. When these genera are better known, doubtless they will be viewed in true perspective and hence re-allotted to their natural affinities.

Subfamily Dexiinae.

It is doubtful if the Australian Dexiinae contains more than seven to ten valid genera for which there are some thirty-five names proposed. I am acquainted with the terminalia of most of these and have concluded that possibly *Chaetogaster* Macq. 1849, and *Paramphibolia* B. & B. 1891, may be too closely related to *Amphibolia* Macq. 1832, to warrant more than one distinct generic conception.

Many of the names proposed may be allotted to subgeneric rank when the species are adequately revised, but at present it would seem those known to me fall into the following synonymy:—

1849

Rutilia Desvoidy 1830.—*Formosia* Guer. 1843, *Diaphania* Macq. 1843 (probably a good subgenus), *Grapholostylum* Macq. 1849, *Pseudoformosia* B. & B. 1889, *Chrysorutilia* Towns. 1915, *Prodiaphania* Towns. (new name for *Diaphania*) and *Euamphibolia* Towns. 1916.

Prosena St. F. & Serv. 1826.—*Prosenina Mall.* 1930.

Rhynchiodexia Bigot 1885.—*Austrodexia* Mall. 1930, *Lasiocalypter* Mall. 1930, and *Lasiocalyptrina* Mall 1930.

Chaetogaster Macq. 1849.

Paramphibolia B. & B. 1893.

Amphibolia Macquart 1846.

Thelaira Desvoidy 1830.

Heterometopia Macq. 1846.

Apatemyia Macq. 1846.—*Toxocnemis* Macq. 1854, *Anatropomyia* Mall. 1930.

Other genera may come here but I have not examined the typical species and in addition I am at a loss to account for *Senostoma* Macquart 1847, in literature. A species before me is evidently congeneric and also from Tasmania. If it be a *Rutilia* then it is comparable to *Diaphania,* but apparently it belongs to *Rhynchiodexia* which name it may supersede. Brauer and Bergenstamm treat the genus in quite a different way, using a different genotype, and Malloch may have been unnecessarily giving the genus a new name in his *Chaetogastrina.* The type is *variegata,* said to have a variegated abdomen and Malloch refers to "checkered" in his genus. The whole matter is very confusing and having only the female I am unable to place Macquart's genus. I suspect the produced oral margin in Macquart's figure is an exaggeration, for on my specimen the extension of the oral margin is present but of moderate dimensions. At most it seems to be a valid generic conception lying between subgenus *Diaphania* and *Rhynchiodexia.* I can see no alliance with the *Amphibolia* group.

Key to the genera of the *Dexiinae.*

1.	With a broad carina, flat on its outer surface	2
	With a carina reduced and rounded on its outer surface, or knife-edged, but exposed between antennae	4
	With carina absent, or at most represented by a keel below the contiguous antennae and thus more or less hidden ..	6
2.	With a large broad abdomen, or if conical then metallic, and the legs normal	*Rutilia*
	With conical, non-metallic abdomen and the legs frequently elongate	3
3.	Proboscis very elongate, several times longer than the oral cone and longer than the head depth; it cannot be withdrawn entirely into the oral cavity (unique to genus)	*Prosena*
	Proboscis normal, not much longer than the oral cone or head length, and readily withdrawn into oral cavity	*Rhynchiodexia*
4.	Highly metallic species with yellowish wings	*Chaetogaster*
	Non-metallic species	5
5.	Brown species, marked only with black	*Paramphibolia*
	Black species with large well defined ashy-grey markings ..	*Amphibolia*

6. First and fifth radial veins with setae (unique to genus). Eyes occupying in profile almost the whole depth of the head (unique to genus) .. .. *Thelaira*

First radial vein without setae. Eyes occupying in profile only about two-thirds of head depth 7

7. Frons on both sexes broad, and together with face bare, highly silvery throughout (unique to genus) and bristles much reduced on male .. .. *Heterometopia*

Frons normal, that of the male reduced in width, hair and bristles normal though variable .. .. *Apatemyia*

The term "proboscis" in the above key follows the restricted use, referring to the part lying beyond the oral cone which bears the palpi. The key does not attempt to isolate the genera on valid structures for which further study is needed, but it covers enough to permit recognition of each segregation. *Prosena* and *Thelaira* are widely distributed, the rest being restricted to the Australian region or practically so.

Subfamily Phasiinae.

Tribe Phasiini.

Morphology.—The mouth parts are subject to wide variation and in one genus the oral cone and proboscis form a single organ, short, apparently functional and with palpi almost equal in length and cylindrical. In another genus the proboscis articulates with the short movable oral cone that bears large broad palpi and the total length does not or hardly exceeds the oral cavity. More frequently the oral cone is found to be long and the palpi either short or very long and even the oral cavity is adjusted to meet these varying lengths which again reflect on the shape of the face.

The nature of the female terminalia is well known and varies from an apparent simple type to that which has one or more horny appendages that constitutes a specialised ovipositor; the advancement may even include a ventral sheath for the structure. The terminalia of the male, however, seems more important at the moment as half the species are described from unique males. Typically the aedeagus is bristle-like in structure and of considerable length, sinuous, curving forward at the basal half and rearwards at the apical half, the amount of curvature varying. On each side of the aedeagus a pair of claspers occurs, small, probably not particularly functional and perhaps even missing at times, or at least not readily seen. In the more generalised species a pair of forceps is present, flanked by the accessory plates, but a modification takes place in the majority of species examined, and there is only one central process, referred to as the fused forceps and is somewhat claw-like.

Taxonomy.—It is my intention to use these characters (hitherto neglected) for the formation of genera, this proposal being of course, the fundamental principle upon which the generic conceptions rest. The following four definitions cover all the species known to me, and appear quite valid as genera.

Genus 1.—Proboscis extremely short, only one apparent segment standing in an ill-defined oral cavity; palpi well developed, about as long as the proboscis. Accessory plates large and much broader than the fused forceps. Vein R_5 and M_1 do not meet. Apparently no species have been described from Australia and I do not know any exotic genera that conform.

Genus 2.—Proboscis short, not longer than the oral cavity within which it lies, the oral cone being very short and bearing large broadened palpi that reach nearly to the apex of the proboscis. Accessory plates tapering, slender, claw-like and conspicuously shorter than the fused forceps. Vein R_5 and M_1 do not meet. Apparently no species are described.

Genus 3.—Proboscis normal; *i.e.,* when protruding is seen to extend further than the oral cavity, the oral cone being long. Palpi cylindrical but short. Accessory plates and fused forceps apparently always short and equal in length. Wings of normal breadth with R_5 and M_1 uniting before reaching the wing margin. *?Hyalomyia.* Most of the described species seem to fall here.

Genus 4.—Proboscis normal; palpi very long and slender, cylindrical. Forceps normal, the two branches being broad and separated; accessory plates very slender and about as long as forceps. Wings conspicuously broadened, the male at least having an inflated costal margin. Veins R_5 and M_1 uniting before reaching wing margin. *?Alophora.* Evidently *aureiventris* Curran comes here.

I do not know how many species have been described, but there are fifteen names in literature that definitely are placed in the tribe, and six generic names applied to the various species. I have seen two of Curran's species (paratypes) and find one may prove to be another genus lying between the second and third given above—*Catharosia varicolor* Curran 1927.

Macquart recorded *Gymnosoma rotundata* Meigen, from Tasmania, and I note from Townsend's manuscript catalogue of Muscoidea of Australia, he has added the record of *Verreauxia auripilis* also from Tasmania and attributed to Desvoidy in 1863, but I have not seen the record. Apparently the first of these is referable to the list of exotic species erroneously labelled in locality and of which there are quite a number now known.

Tribe Palpostomini.

The outstanding character of this tribe lies in the lateral process each side of the labrum and which is palp-like in shape; the feature is mentioned by Desvoidy.

On fresh material these processes are quite palp-like, cylindrical and isolated; they stand at right angles to the broad surface from which they arise and may be flexed at their base to lie in any direction but invariably return when released, for there seems to be no "joint" involved but they arise as a direct continuation of the cuticle of the labrum. On drying the distortion of the labrum may cause these processes to lie directed in some other manner and even the processes may partially collapse.

Palpostoma Desvoidy.

Palpostoma Desvoidy 1830; type *P. testacea* Desy.

Opsophasiops Townsend 1915; type *flava* Coquillett quoted but this was misidentified by that author.

Pseudopalpostoma Townsend 1926; type *P. desvoidyi* Aldrich.

Eustacomyia Malloch 1927; type *E. breviseta* Mall.

Apalpostoma Malloch 1930; type *A. cinerea* Mall.

Synonymy.—I may be premature in placing *Apalpostoma* as being a synonym, but in the description there is nothing mentioned that makes a valid genus, even the spur on the radial vein is encountered as an abnormality in normal *Palpostoma* species. I would suggest that the mouth parts and terminalia be examined to see if the genus should be validated.

Palpostoma aldrichi new name.

Palpostoma testacea Aldrich. Proc. U.S. Nat. Mus lxii., 1922, 4. nec Desvoidy 1830.

Synonymy.—The host of this species, *Lepidoderma albohirtum* Waterhouse, is a North Queensland beetle and it seems impossible for Desvoidy to have received its parasite over 100 years ago and so the fly can hardly be the same species as Aldrich suggested at a venture. Desvoidy's species is more likely to be *P. apicalis* Malloch.

Note.—There are three species before me reared from *Pseudoholophylla furfuracea* Burm., *Lepidiota trichosterna* Lea and *Anomolopha sp.* by Mr. R. Mungomery whilst several more have been reared in other States and again further ones, captured in Brisbane, New South Wales and Tasmania, are before me. It would seem that every large species of Melolonthinae is affected by a different species of *Palpostoma.* There are ten specific names already published and only three of them are likely to be recognised again without access to types.

Subfamily Tachininae.

Section 1.—Genera in which the terminalia have normal, paired forceps.

Genus *Amenia* Desvoidy.

The species in this genus have apparently become so confused that no two authors apply the specific names in the same way. The synonymy has thereby become very involved. The following key is built up on the common forms that have been closely studied, and it will be found that many of the characters given are incorporated in their original descriptions. Several species have been compared with types at the British Museum.

Key to species of genus *Amenia.*

1.	Costa of wing on male with the apical half bowed forwards	6
	Costa of wing normal	2
2.	Second tergite of male abdomen without long median bristles; fourth tergite dark coloured and less metallic than the others	3
	Second tergite of male abdomen with long median bristles; fourth tergite coloured as the others	4
3.	Frons of the male extremely narrow, at the narrowest point being only the width of one ocellus	*parva* Schiner.
	Frons of the male about the width of the ocellar tubercle ..	5
4.	Frons of the male narrow, the eyes being separated by little more than the width of the ocellar tubercle. Small species under 10 mm. long and with silvery postocular orbits	*chrysame* Walker
	Frons of the male wide, being four times the width of the ocellar tubercle	*dubitalis* Malloch.
5.	Species with a pair of coppery longitudinal stripes on the thorax, embedded in the blue or green ground colour ..	*leonina* Fab.
	Species without such stripes and smaller in average size ..	*albomaculata* Macq.
6.	Frons of the male narrow as on *chrysame* to which it conforms in most characters including silvery postocular orbits ..	*sp.* near *chrysame*
	Frons of the male as wide as or wider than that of *dubitalis*	7

7. Medium sized species with frons about five times the width of the ocellar tubercle: proportion 11:2	*sp.* near *dubitalis*
Large species	8
8. Frons nearly four times the width of the ocellar tubercle: proportion 11:3	*sp.* near *imperialis*
Frons about seven times the width of the ocellar tubercle; proportion 14:2	*imperialis* Desvoidy

I do not claim that every species so isolated in the above key is a distinct form, for it has to be determined exactly which characters are specific; nevertheless structural characters like the width of the frons have proved elsewhere very useful for specific recognition and may be relied upon here. The bowed part of the costa is a feature that may prove deceptive and must be used with caution. Malloch added *sexpunctata* to the eastern species, relying on colour characters; I believe I have his form before me, but hestitate to place it at present and anyhow it does not become involved with the purpose of these notes.

Amenia leolina Fabricius.

This was redescribed by Wiedemann and recorded by Macquart. Specimens identified at the British Museum coincide with Wiedemann's description and they correspond with what is presumably *albomaculata* but differ in accordance with the characters given in the key. I do not know if the two forms are conspecific as generally supposed. Engel and Malloch apparently give the name to other species which correspond neither with the coppery stripes, nor with size except the latter in the case of Engel's determination. When the coppery colour occurs on the other species, it is diffused and not stripe-form.

Amenia albomaculata Macquart.

This, I think, is the *leolina* Schiner, and may prove to be a variety of the previous species.

Amenia imperialis Desvoidy.

The confusion between this form and *leolina* seems to have started with Walker and followed by Engel, for I have seen specimens bearing Engel's labels. From Malloch's description it is not possible to tell if he had the present species or the one marked in the key as allied.

Amenia chrysame Walker.

There can be no doubt concerning this determination as specimens have been compared with the type. It is the *parva* of Engel and Malloch and the latter made an error in putting it as a synonym of *parva*. Schiner.

Amenia parva Schiner.

This seems to be the *leolina* of Townsend, Aldrich and Malloch, and I have seen specimens so labelled by Aldrich. Evidently Coquillett was responsible for the initial error. Engel described it as *stricta* Schiner MS., following Brauer and Bergenstamm who evidently regarded another specimen as the type described later by Engel as *parva* but in reality was *chrysame*.

To validate this, reference must be made to the original description of *parva* which is definitely described as having a linear frons and there is no other species known with such a character. It will also be noted that the words "parva" and "stricta" both apply to the frons and Schiner may have made an error in his labels.

Zebromyia ornata Macq.

Phorocera ornata Macquart. Dipt. Exot. suppl 4, 1849, 199.

Zebromyia obesa Malloch. Proc. Lin. Soc. N.S. Wales, liv., 1929, 321.

This synonymy is new and can hardly be disputed. Both sexes are before me. Notwithstanding the marked differences, the species seems to be related to the *Microtropeza*-group, joining it to *Tritaxys*.

Male.—The characters are identical with those of the female except the slightly narrower frons and the fronto-orbital bristles are missing; the summit is about five times the width of the ocellar triangle. The markings of the body are bolder than those on the female but otherwise the same.

Hab.—Tasmania Zeehan, 1924, one male allotype and a female with the head missing. Another female from Hobart, 14th March, 1917.

Tritaxys Macquart.

Tritaxys Macquart. Dipt. Exot. suppl. 2, 1847, 65.

Goniophana Brauer and Bergenstamm. Denk. Akad. Wiss. Wien., lvi., 1889, 97.

Anamastax Brauer and Bergenstamm. Ibidem., lviii., 1891, 349.

Acnephana Townsend. Canad. Ent. xlviii., 1916, 153.

Opsophana Townsend. Ibidem., 153.

Quadra Malloch. Proc. Lin. Soc. N.S. Wales, liv., 1929, 320.

Gonanamastax Townsend. Journ. N. York Ent. Soc., xl., 1932, 472.

A group of genera containing species commonly bred from Lepidoptera and very confused in the literature includes *Sturmia* Desv. and three other genera apparently all valid. The line between some of these genera is not well defined, for *Sturmia* approaches *Winthemia* but has the fringe on the posterior femora interrupted at least by one outstanding long bristle about the centre. *Winthemia*, from two other genera, is separated by the less broad frons containing less bristles and the three are to be recognised in the following key:—

1. Frons very broad in both sexes, the bristles being arranged in two rows each side of the interfrontalia. The fringe of the posterior tibiae is variable but usually present and interrupted by one outstanding long bristle 2

   Frons narrower, normally with only one row of bristles each side of the interfrontalia, although occasionally fortuitous bristles may simulate a second row and then the uninterrupted uniform fringe of the posterior tibiae may be relied upon in cases of doubt .. .. .. *Winthemia* Desv.

2. With a grey-white pulverulent overlay on all tergites. Usually dull coloured species .. .. *Tritaxys* Macq.

   Without such covering, or at most limited to the fourth tergite. Much brighter species with claws irregular in length .. .. *Calopygidia* Mall.

In *Tritaxys* there are variations in the fringe on the anterior dorsal side of the posterior tibiae and some very small specimens seem to have the row reduced to scattered bristles; these small specimens conform to the named forms in other respects and do not seem specifically distinct. Like all the other larger Tachinidae there is a wide range in size of specimens and characters regarded as important for specific recognition are not invariably consistent, making it necessary to check determinations with reliably named material.

Key to species.

1.	Discal bristles on third abdominal tergite and often on the second	2
	Discal bristles absent on second and third abdominal tergites. Normally without bristles on the ocellar tubercle ..	4
2.	Without bristles on the ocellar tubercle. Eyes bare. Arista with second segment about four times longer than wide, reaching one quarter the length of the thickened part, but the first segment is longer than usual. The radial and median veins meet at or before costa. Abdomen distinctly banded black and white with a slight median interruption of the white (*Quadra*)	*ornata* Mall.
	Male with a pair of bristles on the ocellar tubercle. Second segment of arista very short, only as long as wide ..	3
3.	Radial and median veins meet at or before reaching costa. Abdomen with marginal bristles on second, and normally on first tergite and discal bristles on third with which it agrees with *ornata*, but in addition, there are normally discal bristles on the second tergite. Eyes normally bare. Female with bristles on ocellar tubercle	*dissimilis* Mall.
	Radial and median veins widely separated at wing margins. Eyes normally hairy. Female without bristles on the ocellar tubercle. (*Tritaxys, Opsophana,* and *Gonanamastax*)	*goniaeformis* Macq.
4.	Marginal bristles on second abdominal tergite and may be indicated on first	5
	Marginal bristles absent on second abdominal tergite. Second segment of arista about as long as broad or less. Normally with antennae very short, the third segment being about twice the length of the others combined. Eyes bare. (*Anamastax*)	*braueri* n. name.
5.	Second segment of arista abnormally long, occupying up to one half of the thickened portion. Normally eyes hairy on male, bare on female	*milas* Walker.
	Second segment of arista occupying up to one third of the thickened part. Normally eyes hairy. (*Acnephana*)	*rubrifrons* Macq.
	Second segment of arista occupying one quarter the length of the thickened part. Eyes hairy. (*Goniophana*) ..	*heterocera* Macq.

From Tasmania comes a specimen (female) differing from *rubrifrons* Macq. by having yellow-brown legs and a very short second segment on the arista, whilst from the National Park, Queensland, there is a male with brownish legs largely suffused with black on the femora, bare eyes, and bristles on the ocellar tubercle. Both these run to section 5 of the key.

Tritaxys ornata Malloch.

Quadra ornata Malloch. Proc. Lin. Soc. N.S. Wales, liv., 1929, 320.

Hab.—Western Australia: Perth. One male allotype, 16th November, 1912. This specimen has the head less brightly coloured than Malloch's description would indicate, but otherwise it agrees with the female. The frons is about the narrowest I have seen in this genus.

Tritaxys dissimilis Malloch.

Quadra dissimilis Malloch. Proc. Lin. Soc. N.S. Wales, lv., 1930, 343.

Hab.—New South Wales, Queensland. Two males and three females, the latter forming the allotype and paratype series. This is quite a common species of typical *Tritaxys* differing only in two veins meeting. On both sexes the frons is narrower than on *T. goniaeformis* Macq.

Tritaxys goniaeformis Macquart.

Blepharipeza goniaeformis Macquart. Dipt. Exot. suppl. 1, 1846, 157.—Townsend, Ann. Mag. Nat. Hist. (10), ix., 1932, 50; Townsend, Journ. N. York Ent. Soc., xl., 1932, 472 (*Gonanamastax*).

Tritaxys australis Macquart. Dipt. Exot. suppl. 2, 1847, 66.

Masicera rufifacies Macquart. Ibidem., 71.—Brauer, Sitz. Akad. Wien. cvi., 1897, 340; Townsend. Canad. Entom., xlviii., 1916, 153 (*Opsophana*).

Synonymy.—The above are all described from Tasmania, the first as having bare eyes, the second put into a new genus, and the third in yet a third genus all by the one author. Brauer only examined the type of the third, and characters given by him strongly suggest the present position. The synonymy, as here accepted is new, although it has previously been suggested that the first two are conspecific.

The antennae are of average length and the frons is as wide on both sexes as on the majority of the mainland species.

Hab.—Tasmania: Hobart, Garden Island, Eagle-hawk Neck and Strahan, October to March, 1916 and 1924. Two males, four females. Apparently the species is limited to the island.

Tritaxys rubrifrons Macquart.

Gonia heterocera Macquart. Dipt. Exot. suppl. 1, 1846, 153. Males from Tasmania only.

Masicera rubrifrons Macquart. Ibid., suppl. 2, 1847, 69.—Brauer, Sitz. Akad. Wied. cvi., 1897, 339; Townsend, Canad. Ent., xlviii., 1916, 153 (*Acnephana*).

Tritaxys heterocera Townsend. Ann. Mag. Nat. Hist. (10), ix., 1932, 50.

The antennae are very long, the yellowish head is more or less suffused with red, the abdomen is brown, the black being limited to a broad median line and the apex. The ocellar tubercle occupies one fifth the width of the summit which is exceptionally wide, instead of the normal one third.

Hab.—Tasmania: Hobart, November, 1916, and Wynyard, February, 1924.

Tritaxys milas Walker.

Gonia milas Walker. List Dipt. B. Mus., iv., 1849, 799.

?*Tritaxys heterocera* Malloch. Proc. Lin. Soc. N.S. Wales, liv., 1929, 113 (at least in part).

I use the name given by Walker, pending comparisons on the type as it would seem this form and *heterocera* are the only two species likely to be involved. The head characters on the male show slight variations but the ocellar tubercle occupies approximately one-fifth the width of the summit. Malloch's description and figure seem very poor and possibly confused more than one species.

Hab.—Queensland, New South Wales, Victoria. A long series including five males that form the allotype and paratype series. Western Australia: A single female from Perth apparently belong to this species.

Host.—Clania ignobilis Walker (Psychidae). Two females were reared from the pupa by Dr. A. J. Turner, collected at Dalby (24-1-26), Queensland.

Tritaxys heterocera Macquart.

Gonia heterocera Macquart. Dipt. Exot. suppl. 1, 1846, 153; suppl. 3, 1849, 44—females only.

Macquart's species is clearly indicated by his comparison with the Tasmanian form, and Malloch may have the species under this name too, although his remarks fit better the species here referred to as *milas* On the average the summit is a little smaller in the present form.

Hab.—Queensland, New South Wales, Victoria. A long series including five males that form the allotype and paratype series.

Host.—Noctuidae: *Heliothis armigera* Hubn., *Remigera frugalis* Fab., and also some abnormal specimens reared from *Exoa radians* Gn. All reared specimens in the Queensland Department of Agriculture.

Tritaxys braueri new name.

Anamastax goniaeformis Brauer and Bergenstamm. Dank. Akad. Wiss. Wien., lviii., 1891, 349; lx, 1893, 123.—Townsend, Ann. Mag. Nat. Hist. (10), ix., 1932, 50—nec. Macquart; ?nec Malloch, 1929.

Anamastax australis Townsend. Journ. N. York Ent. Soc., xl., 1932, 473.

This is the genotype of Brauer and Bergenstamm's *Anamastax*, although Macquart's species is quoted by them. I think Malloch's determination cannot be the same as he gives his figure a wrong length for the antennae. The ocellar tubercle is so small that it occupies one fifth of the summit which is only normally wide, comparable to that on *ornata.*

Hab.—Queensland. The species is represented in every collection I have examined.

Host.—Cirphis unipunctata Haw. (Noctuidae), in the Queensland Department of Agriculture.

Genus *Calopygidia* Malloch.

Calopygidia Malloch. Proc. Lin. Soc. N.S. Wales, lv., 1930, 349.

Malloch's definition does not hold good for his typical species, based on a variation using three specimens, one said to be damaged. I am unable to define the genus on structure as it bears wide variations that bring it into genus *Tritaxys,* differing, perhaps in having the claws of the anterior legs elongate and short on the others, whereas in *Tritaxys* the species have them either all long or all short. The ridge of the face mentioned by Malloch again is met with in *Tritaxys,* some species having it there, thus invalidating its importance, and I can see no marked difference in the terminalia. The name is worthy of retaining at least as being of subgeneric value.

Calopygidia analis Malloch.

Calopygidia analis Malloch. Proc. Lin. Soc. N.S. Wales, lv., 1930, 350.

This abundant species has possibly been named by an earlier author, but I have not detected it in Macquart's works and I have not yet made the necessary search amid Walker's descriptions. Malloch compares it

with *Winthemia* which is somewhat misleading, the two not being comparable. The colour of the abdomen is normally black with tracings of brown lateral areas more or less defined and is made conspicuous by the dense pulverulent covering of the apical tergite, this being ashy-white.

Hab.—Queensland to Tasmania. A long series of both sexes. On the wing, the male of this fly is likely to be mistaken for *Calliphora dispar* Macq. as it has the same deportment and general features.

Host.—*Phytometra argentifera* Guen. (Noctuidae), in the Queensland Department of Agriculture.

Calopygidia castanea n.sp.

A large chestnut-brown species with a large part of the thorax dorsally, the antennae and tarsi black, together with the median abdominal line and a variable amount of the abdomen at apex which may also be infuscated.

Male.—Frons very wide, approaching one third the head-width and slightly less golden than the rest of the head, with a red-brown interfrontalia and bristles somewhat weak, but two are clearly directed rearwards followed by a series that reaches level to the apex of the second antennal segment and ends not far from the eye margin. There are no ocellar bristles and the hairs that descend down to the face are mainly restricted to about twenty below the frontal bristles and follow the area near the eyes. The facial ridge has about twelve small bristles above the vibrissa reaching from half way to two thirds towards the base of the antennae.

The chaetotaxy of the thorax shows slight variations from the normal, the sternopleurals being arranged 2:1 (normally 1:1 in *analis*). In colour the black of the dorsal area is bordered by brown at sides and apex and has the normal four thin deeper black lines. The abdomen has the marginal bristles of the first two segments clearly defined and the discals may develop on the second and third tergites.

The fringe of bristles on the anterior dorsal side of the hind tibiae is conspicuously present on the basal half, then becomes broken by three or four outstanding bristles in the central area followed by another bristle extra long after which comes the normal fringe but represented by smaller bristles. The claws of the anterior legs are conspicuously longer than those of the others. In many of these and apparently all other characters, it agrees with *analis*.

Hab.—Tasmania. Holotype, one male, Mount Wellington, January, 1924, and two male paratypes, Mount Wellington, February 1917, and Cradle Mountain, January, 1917.

This fly is very similar in appearance to the blowfly *Calliphora nigrithorax* for which it can be readily mistaken as it has the same size, colour and general deportment. It is very quick on the wing and elusive.

Genus *Winthemia* Desvoidy.

Winthemia Desvoidy. Essai Myodaires, 1830, 173.

The vicissitudes through which this genus is passing have complicated the literature beyond my ability to unravel. The Australian material before me forms quite a valid unit to which several names have already been applied. Austen separated one section as *Blepharipoda*

and Malloch another as *Winthemia*, whereas a third may be involved in *Carcelia*, but no modern author seems to have dealt with them. I use the name having priority and am able to apply quite a number of specific names to the group. Other names are excluded from here, as on recognising their identity I have concluded they belong elsewhere. *Exorista diversicolor* and *dispar* Macquart, together with *E. trichopareia* Schiner, said to be a synonym of the latter, will be dealt with in the *Sturmia* complex as they do not belong to the present group unless the generic conception be widened.

All the following forms are consistent in having the fringe of bristles on the anterior dorsal area of the posterior tibiae entirely without interruption, all bristles being of uniform or uniformly grading length, none outstanding nor yet any marked break in the series. No species has more than one normal row each side of the interfrontalia, but one species is liable to have up to three fortuitous ones simulating a second row.

Key to species of *Winthemia*.

1.	Male without, female with one, rearwardly directed bristle on frons, or if more they are weak	2
	Both sexes with rearwardly directed bristles on frons; the female always with two (*?Carcelia*)	5
2.	Abdomen without marginal bristles on the second tergite. Eyes bare. (*Blepharipoda*)	3
	Abdomen on male usually without, on female with marginal bristles on second tergite. (*Winthemia*)	4
3.	Face entirely bare	*australis* Walker.
	Face hairy only on the upper half (female unknown)	*sp.*
4.	Face especially unusually narrow; hair weak on male, minute on female. Legs entirely black	*translucens* Macq.
	Face and frons broader, tibiae distinctly brownish	*sp.* (Tasmania)
	Face and frons still broader, male with marginal bristles on second tergite	*lata* Macq.
5.	Without marginal bristles on second tergite. Male with one rearwardly directed bristle on frons. Eyes and face hairy	*lateralis* Macq.
	With marginal bristles on second tergite. Face bare ..	6
6.	Male with one rearwardly directed bristle on frons, the summit rather broad	*varipes* Macq.
	Male with two rearwardly directed bristles on frons, the summit much narrower (try *Podomyia* B.B.)	*marginata* Macq.

Winthemia australis Walker.

Tachina australis Walker. Ins. Saund. Dipt., 1856, 279.

Tachina zebina Walker. Austen, Ann. Mag. Nat. Hist. (7), xix., 1907, 332, 346 (*Blepharipoda*).

Synonymy.—Austen has dealt with synonymy, claiming that the Indian species *zebina* reaches through the orient to Queensland and New South Wales, whereas before me two species are apparent and yet come here. I do not wish to dispute the synonymy at the present time but think it advisable to retain the name of Walker's species until the complex, if it be one, is revised once more. A third apparently distinct species in Australia is isolated in the key but is only known to me by a male. This form has distinctly indicated, the frontal hairs descending far below the bristles reaching half way down the face, thus approaching the more typical *Winthemia spp.*, but in every other respect it comes into the *australis*-group which is liable to develop fortuitous bristles on the frons.

Host.—Ochrogaster contraria Walker (Notodontidae); the Procession moth. The parasite reared is the dark form and was identified by Austen as *zebina* in the Queensland Museum which indicates this should be the typical *T. australis.*

Papilio aegeus Don. The same dark form was reared from this butterfly by myself in 1922.

Sphingidae. The light form has been reared by others as well as myself from the pupa of hawk-moths, the genera not being determined.

Winthemia translucens Macquart.

Exorista translucens Macquart. Dipt. Exot., suppl 4, 1849, 189.

Malloch has put in *Winthemia* two species which apparently fall into the main section and he had but one male in each case and used minor differences in distinguishing them. A very long series before me, largely bred, shows variations especially in size, so I have to leave the determination of Malloch's form but believe *diversa* Mall. will prove a synonym of the present species.

Hab.—New South Wales and Queensland.

Host.—Euploea corinna Macleay (Nymphalidae); *Anaphaeus teutonia* Fab. (Pieridae); *Ochrogaster contraria* Walk. (Notodontidae); all in the Queensland Museum.

Winthemia sp.

Hab.—Tasmania: Hobart. Two males only.

I have found no name that can be applied to this species which seems quite distinctive in head characters.

Winthemia lata Macquart.

Exorista lata Macquart. Dipt. Exot., suppl. 3, 1848, 47.

The broad white parafacial area with white hairs is unmistakable for the identification of this species and Malloch may have it under his *albicens.*

Hab.—New South Wales and Queensland. Only a few specimens are available to me and one I have marked as the allotype female.

Host.—Ochrogaster contraria Walker (Notodontidae); in the Queensland Museum.

Winthemia lateralis Macquart.

Masicera lateralis Macquart. Dipt. Exot., suppl. 1, 1846, 163.

Hab.—Queensland and New South Wales. Allotype female and a long series of paratypes as well as males.

Host.—Papilio aegeus Don. A very long series was reared from this source. Also *Papilio sthenelus* Macleay. Both cases in the Queensland Museum.

Winthemia varipes Macquart.

Masicera varipes Macquart. Dipt. Exot., suppl. 1, 1846, 163.

Hab.—Tasmania: Hobart, October and January, 1913, 1914, and 1924. Four males and one allotype female.

Winthemia marginata Macquart.

Exorista marginata Macquart. Dipt. Exot., suppl. 4, 1849, 188.

Masicera similis Macquart. Dipt. Exot., suppl. 4, 1849, 194.

This is the common Brisbane species met with throughout the year. The female was described as *similis* probably from Sydney, a damaged specimen being used judging from the remark "en grande partie dénudée." The coloration and markings of the abdomen correspond to Macquart's figure of *E. marginata* and according to Macquart's methods should have been placed in *Masicera,* but presumably he overlooked the two backwardly directed, sometimes small frontal bristles, on the narrow frons of the male.

Hab.—Queensland and New South Wales.

Section 2.—Tachininae that have the terminalia with the forceps fused into one central organ lying between the paired accessory plates.

Genus *Peleteria* Desvoidy.

Peleteria Desvoidy. Essai Myodaires, 1830, 39.

This palaearctic genus has not hitherto been recorded from Australia but belongs to the *Echinomyia*-group, or in accordance with Lundbeck, belongs to the *Tachina*-group, if the rules of priority are to stand. The Australian species is very typical of its genus, is black with a densely haired fourth tergite entirely red, resembling somewhat a bee of the genus *Megachile.* There is no name given for the Australian species as far as I have ascertained unless it be *P. javanica* Desv., from Java.

Host.—Heliothis obsoleta Fabr. (Noctuidae).

Genus *Tricholyga* Rondani.

Tricholyga Rondani, 1859.

Several palaearctic species are in this genus and one at least reaches Australia. I think I am correct in this as Lundbeck states the forceps of *sorbillans* Wied. contains a covering of dense, yellow-red hairs and the colour on the specimens before me is "old-gold" and the species is from Tasmania.

From Queensland come two further species, one having a curved tuft of yellow-red hairs standing erect at the base of the forceps, the hairs changing from red to yellow with the incidence of the light, and the other species has only a light covering of black hairs, the dense tuft being entirely absent. The first and third species have a golden head, the other has this more silvery and the only female I have belongs to it. The genus is represented in several collections.

Tricholyga sorbillans Wiedemann.

Tachina sorbillans Wiedemann. Auss. zweifl. Ins., ii., 1830, 311. Canary Islands.

Exorista flaviceps Macquart. Dipt. Exot., suppl. 2, 1847, 67. Tasmania.

Synonymy.—Brauer is responsible for placing the species described by Macquart, in a generic position, but it seems from species already known in Australia it is referable to the one form.

Hab.—Tasmania to New South Wales, and probably Queensland.

Host.—*Cirphis unipuncta* Haw., in the Queensland Department of Agriculture, is the host of apparently this fly but I have not examined the terminalia of the parasite.

The *Micropalpus-Chaetophthalmus complex.*

There are a number of species described from the Commonwealth as having small palpi and as the group has been associated with parasitism on Lepidoptera, I have made the attempt to straighten out the very involved taxonomy. I do not regard the generic status given below as well established but it certainly brings together groups of related species. I refer *Micropalpus vittatus* Macq. and *M. pilifacies* Macq., to genus *Cuphocera,* whilst *Aprotheca rufipes* Macq. (try Dexiinae) is apparently a representative of a genus unknown to me. I have failed to discover the identity of *Myobia rufifacies* and *tenuisetosa* Macq., both placed in *Chaetophthalmus* by Brauer notwithstanding the long palpi in the original figures and so doubt if they belong here.

Linnaemyia nigripalpis Tryon, in accordance with its name, should come into this section, but the specimens described seem to be lost and the illustrations somewhat confusing as if the present series, *Tritaxys* and the head of *Metallea* (Calliphoridae) have been mixed.

The genera as here isolated are tentative, the problem of nomenclature being involved in the world's fauna.

Key to genera.

1.	Both sexes with frontal orbital bristles. Face hairy. Third and fourth tergites strongly tending to amalgamate, although the division between them is discernible even in the most advanced cases ..	*Amphibolosia* Surcouf.
	Only the female with fronto-orbital bristles. Third and fourth tergite not amalgamating	2
2.	Face distinctly hairy	*Chaetophthalmus* B. & B.
	Face bare	*Micropalpus* Macq.

Genus *Amphibolosia* Surcouf.

Amphibolosia Surcouf. Nouv. Arch. Hist. Nat., Paris (5), vi., 1914, 109. Type, *Ochromyia flavipennis* Macq.

Ballardia Curran. Bull. Ent. Res., xviii., 1927, 166. Type, *B. pallipes* Curran.

Surcouf described Macquart's species from the type, a female, in such an excellent manner that its identity is not in doubt. In revising collections I was able to incorporate paratypes of Curran's species and it has proved not practical to separate them into another species thus leaving three units that are definitely recognisable as valid. When the terminalia have been subject to more intensive study, it may be possible to define the three forms into more than one species each but I do not think this likely.

Key to species of *Amphibolosia.*

1.	Summit of head very wide, the ocellar tubercle being about one fifth of it. Acrostichal bristles frequently only 2:3 but varies	*pallipes* Curran
	Summit of head narrower, the ocellar tubercle being only about one third the width. Acrostichal bristles invariably 3:3	2
2.	Ocellar tubercle about one and a quarter its own width from the eyes. Fifth sternite relatively small	*sp.*
	Ocellar tubercle hardly more than its own width from the eyes. Fifth sternite enlarged. Frons usually much darker than on the others and in addition there is a conspicuously well developed tuft of hairs at the base of each accessory plate	*nudistylum* Macq.

Amphibolosia pallipes Curran.

Ochromyia flavipennis Macquart. Dipt. Exot., suppl 4, 1849, 245, preocc. Macq. 1843.

Ballardia pallipes Curran. Bull. Ent. Res., xviii., 1927, 166.

Hab.—Queensland, New South Wales, Victoria. This is a very common species and very variable.

Amphibolosia nudistylum Macq.

Ochromyia nudistylum Macquart. Dipt. Exot., suppl. 5, 1854, 111.

Hab.—South Australia to Tasmania. This species which is abundant in Hobart is also represented from the type locality, Adelaide.

Chaetophthalmus similis Walker.

Tachina similis Walker. Ins. Saund. Dipt., 1856, 266.

?Chaetophthalmus biseriatus Malloch. Proc. Lin. Soc. N.S. Wales, lv., 1930, 311.

I do not know all the characters of the male on Walker's species as the only male before me has had the terminalia mounted and in the extracting the sternites have broken away, but if Malloch's species proves the same, as expected, then it should have a second row of outstanding black bristles situated on the sternite anterior to that of *brevigaster*. There are other species before me on which no such bristles occur and I have found no names yet that apply to them.

Hab.—New South Wales. This is the common Sydney species.

Chaetophthalmus brevigaster Macquart.

Micropalpus brevigaster Macquart. Dipt. Exot., suppl. 1, 1846, 149.

Hab.—Tasmania. Very abundant in the island and recognisable by the male having a dense row of apical bristles on the preapical ventral sternite.

Micropalpus bicolor Macq.

Micropalpus bicolor Macquart. Dipt. Exot., suppl. 3, 1848, 44.

Hab.—New South Wales. I have no specimens from the type locality which is probably Sydney, but Tasmanian specimens before me agree except in having a jet black area on the parafrons and Malloch gives his specimen as being greenish-black there, whilst Macquart states "brunatre." I cannot judge how many species may be involved.

Micropalpus concavicornis Macq.

Micropalpus concavicornis Macquart. Dipt. Exot., suppl. 4, 1849, 173.

This species is not a *Micropalpus* in the restricted sense as the shape of the palpi and the very long spur of the radial vein are characters it bears in common with *Cuphocera*.

Hab.—Queensland to Tasmania. A very abundant Brisbane species.

Genus *Actia* Desvoidy.

Actia Desvoidy. Essai Myodares, 1830, 85.

These very small parasites of Lepidoptera are well known owing to their abundance, but the species are so dealt with that without types or specimens from the type localities, it is not often that they can be

recognised again. Like all the Tachinidae they are subject to variations and doubtless several species are not valid and two names are reduced to synonymy here.

The Australian species described so far are recognisable by the venation which has setae at least along the fifth radial vein as far as the radio-median cross-vein and a pair of dorsal marginal bristles on the third tergite of the abdomen, no discal bristles on the second and third tergites. These together with other species yet to be described are allied to the European forms. There are three marked groups amongst those described and species within each show considerable intergrading.

A. eucosmae-group incorporated *eucosmae* Bezzi., *darwini* Mall., *baldwini* Mall., *niaritula* Mall., *plebeia* Mall., and probably *argentifrons* Mall. There are five valid species certain.

A. fergusoni-group incorporated *fergusoni* Bezzi, *valida* Curran, *parviseta* Mall., and probably *invalida* Mall., together with a number yet to be described. Three names are definitely valid.

A norma-group is a temporary name for a group containing species not certainly recognised and some undescribed forms. The former I would judge to be *norma* Mall. and *lata* Mall. although the descriptions are inadequate for this recognition. The forms before me are apparently associated but not necessarily conspecific.

The following key shows the leading features for the recognition of these three groups:—

1. Outer cross-vein remote from inner cross-vein (radio-median) being about half way towards the bend of the median vein 2

   Outer cross-vein near to, and not much more than its own length from, the inner cross-vein. Antennae short .. *eucosmae*-group.

2. Arista short, second segment often elongate and at most the third segment of arista as long as the third antennal segment .. .. *fergusoni*-group.

   Arista long, second segment always short and the third segment of arista always longer than the third antennal segment ? *norma*-group.

Host.—There are two species in collections reared from Noctuidae, namely *A. plebeia* Mall. from *Erias huegeli* Rogen, and *A. nigritula* Mall. from one of the plague caterpillars on grass.

Actia darwini Mall.

A. darwini Malloch. Proc. Lin. Soc. N.S. Wales, liv., 1929, 334.

A. brevis Malloch. Ibidem., lv., 1930, 309.

A. quadriseta Malloch. Ibidem., lx., 1936, 20.

Synonymy.—The name *brevis* applies to a reduced number, and *quadriseta* to an increased number of setae on the lower median vein, whilst the latter also has the fourth postsutural dorsocentral bristle present. Before me are specimens that incorporate these and other variations showing the synonymy can hardly be disputed.

Hab.—Widely distributed over the northern half of Eastern Australia and it is the most common *Actia* in the Brisbane district.

APPENDIX TO PART 2.

Pyrellia australiensis Curran.

P. australiensis Curran. Ent. Mitt., xvi., 1927, 345.

P. sp. Hardy. Proc. Roy. Soc., Queensland, xlviii., 1936, 25.

The name given by Curran was overlooked and the description indicates the identity of the species is that form left unnamed by me.

Genus *Balioglutum* Aldrich.

Balioglutum Aldrich. Proc. Nat. Mus., lxvi., 1925 9 (Smithsonian separates No. 2555).

This genus, hitherto unknown to me, belongs to the non-metallic group, with sternopleurals arranged 0:1 according to Aldrich and 1:1 on the specimen before me, and has the squama, pteropleura, prosternum, interfrontalia bare; wings as described by Aldrich except the "few distinct hairs below, none above," seems not to apply invariably within the genus, the third vein being entirely bare on the specimen before me. Prescutellar acrostichals absent and the arista with only a few filaments on the basal half. The typical species is described as having parafrontals and parafacials golden, which does not apply to the form before me where these are black.

Balioglutum illingworthi Aldrich.

B. illingworthi Aldrich. Ibidem., 1925, 10.

North Queensland.

An allied species, from Goondiwindi, represented by a single female has the superficial colour nearest to the slate blue of *Passeromyia,* red antennae, and an entirely dark frons which approaches best the shape of that on *Graphomya.*